

Purpose: This lesson introduces students to the soybean as a commodity grown by Minnesota Farmers. In this lesson, Soybeans are used for counting activities and
Time: 45 minutes

Level: K

Materials:

- Soybean plant
- Soybeans (these can be obtained from local farmers or you can use soy nuts from the grocery store)
- Plastic re-closable sandwich bags
- Colored stickers
- M&Ms or a chocolate candy of your choice



Show Me the Beans!

Minnesota Math Standards and Benchmarks

- K.1.1.1 Recognize that a number can be used to represent how many objects are in a set or to represent the position of an object in a sequence
- K.1.1.2 Read, write and represent whole numbers from 0 to at least 31.
- K.1.1.3 Count with and without objects, forward and backward to at least 20.
- K.1.1.4 Find a number that is one more or one less than a given number.
- K.1.2.1 Use objects and draw pictures to find the sums and differences of numbers between 0 and 20.

Background

Soybeans (sometimes referred to as beans) are bushy green plants from the legume family. Legume plants have the ability to use soil bacteria to form a nodule by pulling nitrogen from the air and using it for its growth. This is important for growing healthy crops and maintains soil quality, and also reduces the cost to farmers and gardeners for fertilizers. The fixating of nitrogen by soybeans also causes the seeds and pods to have a very high protein content.

Minnesota farmers plant soybeans in the late spring. During the summer, soybean plants flower and produce 30-40 pods, each containing three, pea sized beans. In the early fall, farmers harvest the crop which is high in protein and oil. A 60 pound bushel of soybeans yields about 48 pounds of protein-rich soybean meal and 11 pounds of oil.

Minnesota ranks third in the nation in soybean production. In 2010, 7.4 million acres of soybeans were planted in Minnesota. Minnesota soybean growers were able to harvest over 328 million bushels of soybeans from this land.

Soybeans are one of the most versatile crops in the world. When crushed and pressed, soybeans produce oil that is used in margarine, cooking oils, salad dressings, mayonnaise and many prepared foods. Soybean oil contains no cholesterol and is low in saturated fat so it is popular with health-conscious people. Soybean oil is also used to make paints, varnishes, soaps, cosmetics, plastics and crayons. Soybean oil is even used to make ink for printing newspapers and magazines. Soy biodiesel is another product made from soybean oil. This fuel is used in cars, trucks and buses which reduces pollution and increases engine performance. After soybean oil is removed in processing, the remaining flakes are processed into food products or protein meal for animals. Soybean meal is an important protein source for livestock and poultry.

Information from: <http://www.mnsoybean.org/> and Minnesota Ag in the Classroom Soybean Commodity card.

This lesson will allow students to learn about soybean production in Minnesota and also practice counting skills and basic subtraction and addition.

Procedure

1. Before class begins, prepare sets of re-closable sandwich bags. Each set includes 10 bags with a colored sticker on it. In each bag put a

number of soybeans from 1 to 10. If you have 20 students in your class you would need two sets. One set might have green stickers; the second set could have blue stickers.

2. Display a soybean plant to the class. Plants can be obtained from area farmers or you can grow your own from a soybean seed. A picture or diagram of a soybean plant would also work. Minnesota Agriculture in the Classroom has free commodity card sets that include the soybean. See <http://www.mda.state.mn.us/kids/commoditycards.aspx>
3. Tell students that soybeans are an important crop grown in Minnesota. If possible bring in products (chocolate, plastic, crayons, vegetable oil, etc.) that contain soybeans and explain to the students that all of these products are made using the soybean seed.
4. Use the background information to give a brief explanation of how soybeans are grown. You could also use the video from the Minnesota Agriculture in the Classroom website that shows a soybean farm. The video is one minute and 35 seconds long. <http://www.mda.state.mn.us/kids/videostories/feedus.aspx>
5. Ask the students how many soybeans they think are in each pod. If you have a soybean plant, give each student a pod and tell them to open it up and see how many seeds are inside. If you do not have a plant, you can get soybeans from a local farmer or soy nuts can be used instead. Soy nuts are roasted soybeans and can be purchased in most grocery stores. Give each student 3 soybeans or soy nuts.
6. Have students place their 3 soybean, one at a time, into a box, hat, etc. Have each count out loud – the first student will count “once, two, three.” The second student will count “four, five, six.” Continue the cumulative counting until all students have placed their beans in the box.
7. Have the students transfer their soybeans from the box into another container, this time counting backwards. If there are 20 students in your class, the first student would transfer his/her three seeds counting “twenty, nineteen, eighteen.” Continue until all students have transferred their soybeans and you are back at “one.”
8. Hand out the prepared sandwich bags that each have soybeans and a sticker. Please tell students to keep their bags closed at all times. Offer an incentive – all students who keep their bags closed will receive a sweet surprise at the end.
9. Ask students:
 - a. Whats inside your bag? (Soybeans)
 - b. What are soybeans used for? (food, plastic, biodiesel, etc)
10. Tell students to find all of the other students who have the same color sticker as they do and form a small circle.
11. Instruct students in each circle to organize themselves into a straight line in order from one to ten according to how many soybeans are in their bag.
12. Use the groups to demonstrate the following
 - a. Select two students and ask them to add up the total number of beans in their bags. Example: student 7 and student 3 = 10 seeds or student 2 and student 1 = 3 soybeans
 - b. Select two students and ask them to subtract the number of beans. Example: student 10 minus 1 = 9 soybeans. You can have students physically remove one bean and count how many are left if you would like.
 - c. BONUS QUESTION How many total beans are there in all of the bags in your group? (55 soybeans)

13. If time allows collect the bags and redistribute. Have students organize themselves again and complete addition and subtraction problems.

OPTIONAL: Give students M&Ms or other chocolate candy for keeping their bags closed and participating. Remind students that there are soybean products in the chocolate.

Additional Activities

- Plant the soybean seeds in a small pot with soil or place the seeds in a plastic bag with a wet paper towel. The seeds should sprout in just a few days.
- Invite a local soybean farmer to visit your classroom and share his/her story about raising this important crop.

Collect labels from the students' favorite foods. Look at the ingredients list and see if any of them contain soy.

Resources

- The book *SOYBEANS in the story of agriculture* is a great read-aloud book or it can be used by the teacher for additional background information.
<http://www.mda.state.mn.us/kids/childrens-lit-bundle.aspx>
- Agriculture By-Products Placemats show the many uses of soybeans and other agricultural products grown in Minnesota. These are available FREE from Minnesota Agriculture in the Classroom.
<http://www.mda.state.mn.us/kids/teachresources/byproducts.aspx>

Adapted from North Carolina Agriculture in the Classroom